MONTANA UNDERGROUND STORAGE TANK PROGRAM NEWSLETTER

MUST News

Photo by J. Finn

Department of Environmental Quality Winter Issue 2011

DEQ Emergency Response to Miles City Gasoline Release

On October 27, 2010, DEQ was notified by the Miles City Fire Department that there were gasoline odors in the basement of the Lewis and Clark Apartments. Vapors were severe enough that the apartments had been evacuated. DEQ arrived on site, confirmed the high levels of vapors in the apartment building, and identified that the source of the vapors was from the Short Stop Service Station to the north of the apartments. Tests conducted on the underground storage tanks (USTs) and lines revealed a leak from one of the tanks. When the tanks were removed, a small diameter hole was observed in the bottom of that UST.

Exterior Penetration Measured

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Site of the gasoline leak at the Conoco Short Stop, Miles City, MT.

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Montana Department of Environmental Quality

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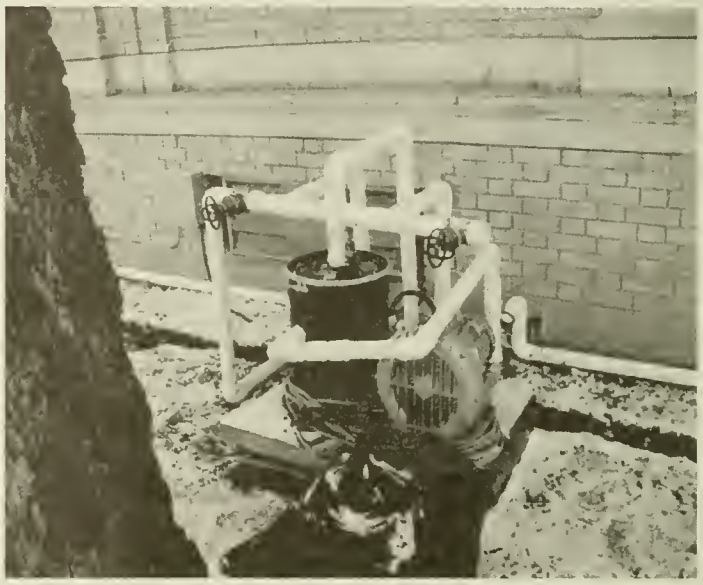
DEQ Emergency Response to Miles City Gasoline Release - *continued from page 1*

Interior penetration of the leaked underground storage tank

Petroleum fuel leaked through the hole in the bottom of the UST, which was bedded in pea gravel just above groundwater. Therefore, gasoline had a direct route to groundwater. Petroleum spread across the groundwater in every direction, impacting the apartment buildings to the south in the upgradient direction. Petroleum spread underneath Pleasant Avenue to the north, where free product was soon under the Post Office building. Vapors were detected in the Post Office building, prompting its evacuation.

Vapor Extraction Stack on the east side of the Post Office

DEQ immediately began the investigation and mitigation of the petroleum release. Vapor mitigation was difficult to achieve in the apartment building because half the building did not have a concrete slab, instead the floorboards were installed directly above a dirt floor. DEQ installed a soil vapor extraction system on the north side of the Lewis and Clark Apartment building, between it and the leaking UST, to remove vapors from the subsurface. DEQ also installed a positive pressure



Soil Vapor Extraction Blower and knockout tank at southwest corner of the Post Office

system in the area within the Lewis and Clark Apartment building that did not have a concrete slab. This included the acquisition of a fan that needed to be fabricated and delivered from Osseo, Wisconsin. Vapor mitigation in the Post Office was also difficult because of the building's large footprint. To mitigate vapors in the Post Office, DEQ installed four subslab depressurization ports through the basement slab of the building that are designed to vent vapors accumulating directly beneath the slab, and two soil vapor extraction systems that are designed to intercept vapors along the southern and western walls of the building. Benzene concentrations have decreased from up to 12,000 ug/m3, or micrograms per cubic meter, to beneath the regional screening level of 3.3 ug/m3 in the Lewis and Clark Apartments. Because of the mitigation system, it is now safe for people to reoccupy the building.

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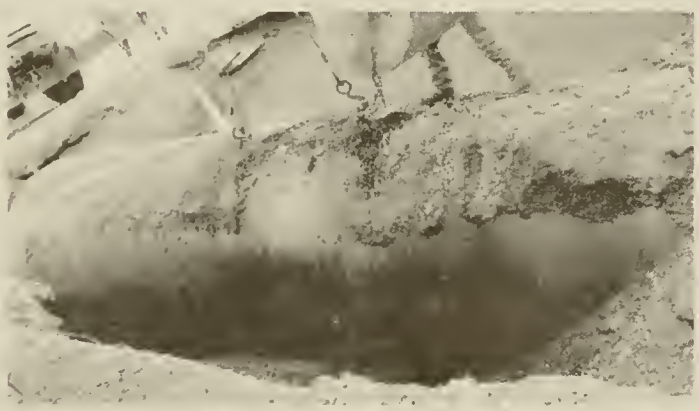
DEQ Emergency Response to Miles City Gasoline Release - *continued from page 2*

Vacuum truck recovers fuel from recovery wells on south side of Post Office

In addition to the vapor mitigation efforts within the Lewis and Clark Apartments and the Post Office, DEQ has installed 5 soil vapor monitoring wells, 14 one-inch groundwater piezometers, 22 four-inch recovery wells, and 2 two-inch monitoring wells. As of January 6, 2010, approximately 4,532 gallons of product had been directly removed from various recovery wells utilizing a vacuum truck that drove from well to well. After determining a radius of influence of up to 50 feet per well, five separate soil vapor extraction systems were installed onsite to the north and south of the former UST basin and to the north of Pleasant Avenue. The free product recovery effort will continue as long as there is measurable product in the wells, and the soil vapor extraction system will operate until it is no longer removing appreciable vapors. Groundwater monitoring will continue to make certain that the dissolved petroleum and free product plumes remain stable or shrink. ■

Excavation of the underground storage tank basin



Tank removal during excavation of the underground basin

Petro Factoid... What do you do if you smell petroleum?

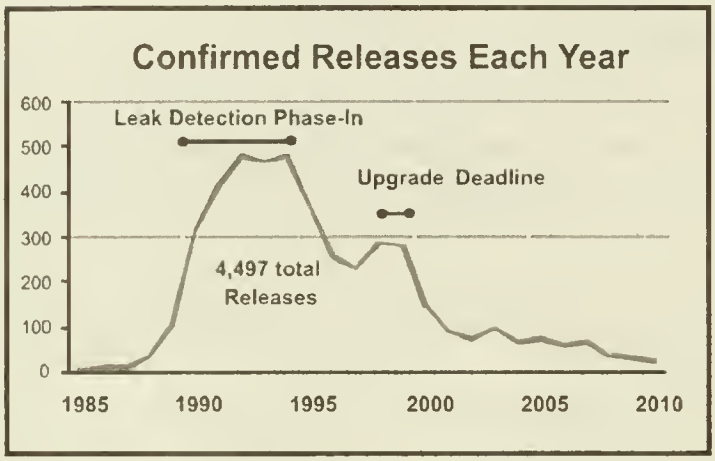
Detect a persistent, suspicious petroleum odor without a known source? Call your local fire department right away.

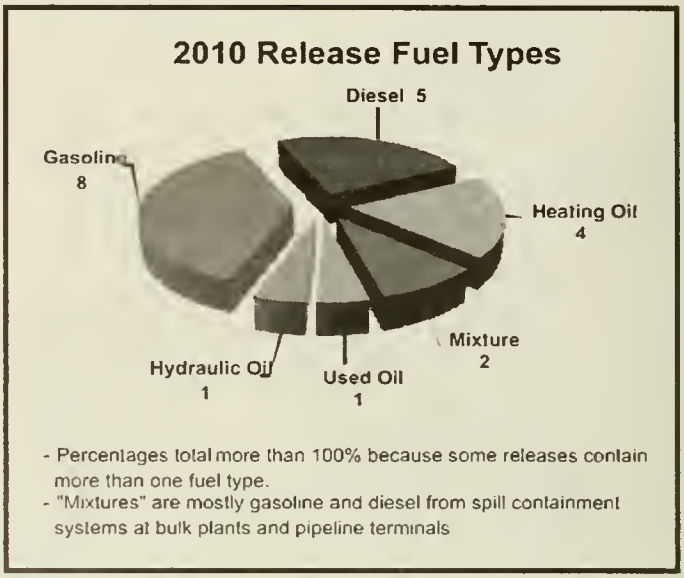
Suspect a petroleum release from an underground storage tank? Call the DEQ Leak Line at 1-800-457-0568.

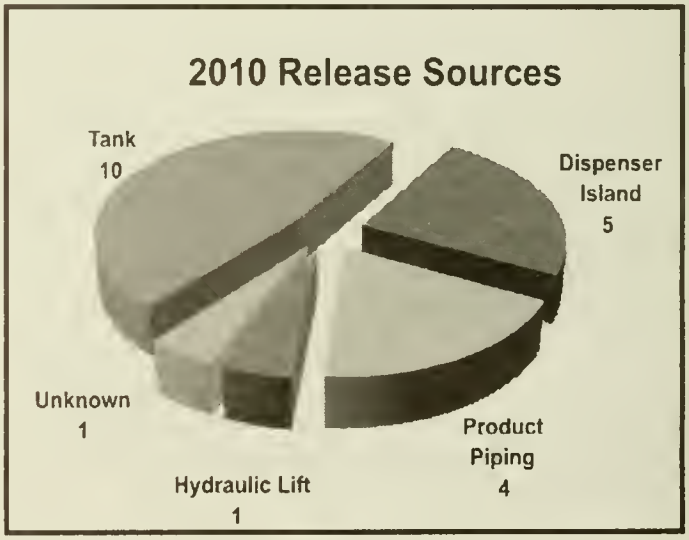
After hours? Call the new number for Disaster and Emergency Services at 406-324-4777.

Tank Release Autopsies for 2010

Montana's number of new releases from above- and underground storage tanks has leveled off at 20 to 30 each year. This predictable reduction in leaky petroleum storage tanks validates America's foresightedness in the early 1980s in addressing the aging tank population. As a result of new laws requiring the initiation of modern release detection methods and the deadline to replace or close all substandard tanks by 1998, many ongoing releases were identified and confirmed. The table reflects the tremendous number of releases that were discovered during the1990s as tank owners upgraded and removed their tank systems. Following the 1998 deadline to have all substandard tanks removed or replaced, the annual number of releases confirmed has steadily dropped to its current steady state. The statistics reported here reflect information about the 20 petroleum releases confirmed during Federal Fiscal Year 2010 (October 1, 2009, to September 30, 2010).




2010 Release Fuel Types
Diesel 5
Gasoline 8
Heating Oil 4
Mixture 2
Hydraulic Oil 1
Used Oil 1
- Percentages total more than 100% because some releases contain more than one fuel type.
- "Mixtures" are mostly gasoline and diesel from spill containment systems at bulk plants and pipeline terminals



The year's petroleum releases were again dominated by gasoline and diesel motor fuels, followed by heating oil, which has the same chemical composition as diesel, and only one incident each of hydraulic oil and used motor oil. There were two releases from tanks containing mixtures of bulk fuels. Because those two releases came from spill/overfill containment systems at a bulk plant and pipeline terminal that handles common fuels, the contamination was primarily gasoline and diesel range hydrocarbons.

Half of the 2010 releases originated from the actual tanks, more than releases from dispenser islands and product piping combined. However, only four of those tank releases were associated with active tanks, and two of those appear to be old spills and overfills. Only two releases definitively leaked out of holes in the tanks; both were above ground heating oil tanks. One was caused by vandalism and the other was caused by corrosion.

While tank failure appears to be minimal this year, dispensers and piping were less intact. Releases were

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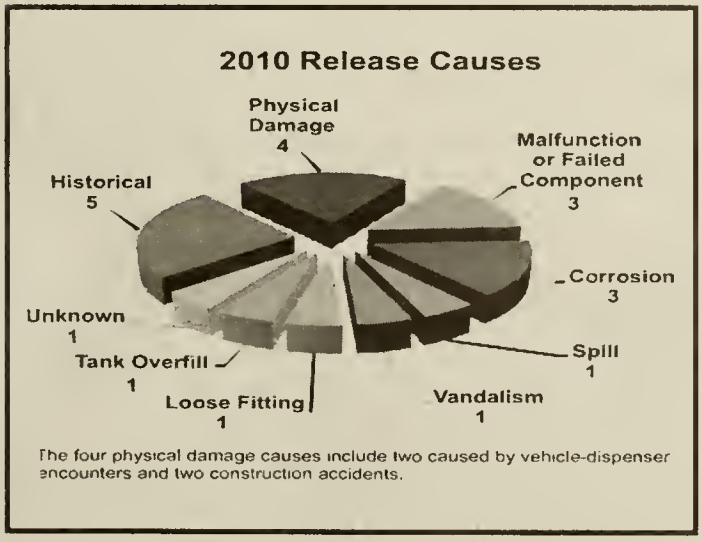
Tank Release Autopsies for 2010 – *continued from page 4*



The four physical damage causes include two caused by vehicle-dispenser encounters and two construction accidents.

caused by corrosion holes in pipes, faulty breakaway valves, faulty check valves, as well as four accidents. Two of the accidents involved automobile encounters with dispensers, while the other two involved construction equipment contacting tank systems. One release was caused when a utility company drilling a communication line horizontally under a sidewalk hit the underground tank, pushing it out of alignment and breaking a pipe. The other construction accident happened during the excavation of contaminated soil from a previous release, when a backhoe hit an above ground tank. Even though 5,000 gallons of used oil were released from that tank, one of the larger releases for the year, it was fortunate that the equipment was already on site so the new contamination was immediately cleaned up.

While it is easy to recognize that releases are still being caused by human error and faulty or deteriorating equipment, the overall low number of new releases is a credit to tank owners, inspectors, and DEQ working together to ensure we all protect Montana's last best environment. Now that the number of releases appears to have leveled off at a manageable level, we still have a backlog of 1,534 active releases we can focus on cleaning up. ■

Enforcement 2010 Year-End Review

The Montana Department of Environmental Quality currently has 17 Underground Storage Tank (UST) cases under development and has collected penalty payments totaling $5,264 for violations of the Underground Storage Tank Act identified in 2010.

During 2010, the DEQ Enforcement Division settled the following enforcement actions:

Dutton School District 28 of Dutton, Montana reached a settlement agreement with DEQ which included a $395 penalty for failure to conduct monthly tank leak detection and operating without a permit at the Dutton Public School.

The failure to conduct monthly tank leak detection at the Huson Mercantile resulted in a $650 penalty for Huson Mercantile, Inc.

Keith Kinden paid a $2,000 administrative penalty for violations, including the failure to conduct tank leak detection due to a failure to have passing leak detection records and failure to correct a violation by the corrective action date at a UST system serving the Libby Airport.

Prairie States Co-op paid a $1,354 administrative penalty for violations including the failure to conduct monthly tank leak detection and operating without a permit at Prairies States Co-op in Dagmar.

Tom and Theresa Pelican of Swan Lake paid an $865 administrative penalty for violations including the failure to obtain a compliance inspection within the required timeframe and operating without a permit at the Swan Lake Pelican Quick Stop.

For more information, contact the Enforcement Division's Darrick Turner at dturner2@mt.gov or (406) 444-1504. ■

Petro Factoid. . . Tank Removals

Owners/operators of underground storage tanks (USTs) may face the need to do tank removals in response to the accidental release of product. A tank may be releasing product through a hole caused by corrosion and so may need to be repaired if allowed by DEQ, or replaced.

Another reason for removing a tank is if the owners/operators are reconfiguring their UST systems to accommodate business changes. They also may opt to replace older tanks that have become obsolete. The average life expectancy of a steel tank is about 30 years. Unfortunately, the replacement cost is high – about $50,000 to $100,000 for a new fiberglass tank. Plus, according to the Energy Act of 2005, any new tanks installed need to be double-walled.

If you have questions about tank removals, please contact the UST Section of the Montana Department of Environmental Quality at (406) 444-1417 or **http://deq.mt.gov/UST/default.mcpx**.

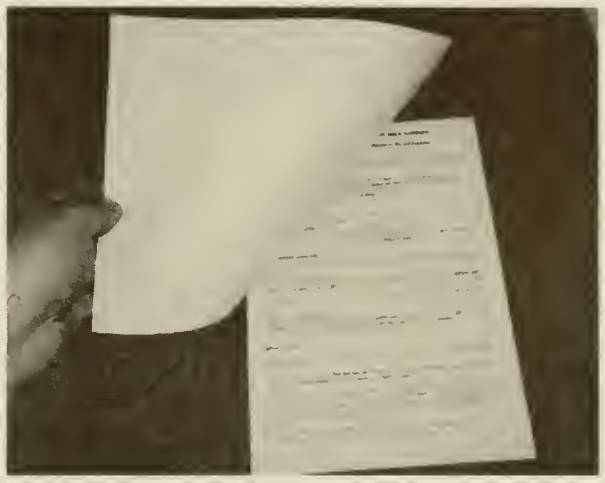
MT DEQ UST Compliance Assistance is a Home Run

Montana DEQ Underground Storage Tank (UST) program is dedicated to the communities that it regulates and serves. The UST management team has recently decided to strengthen its program by offering compliance assistance. Compliance assistance means helping businesses and local governments meet their environmental regulatory requirements. Compliance assistance can take many shapes and forms including online resource centers, fact sheets, guides, distribution of regulatory guidance materials, and training opportunities. The UST program offers all of these options, but believes that the best way to assist operators is through providing opportunities for onsite, one-to-one meetings.

Last year, the team decided to focus on new UST owners and operators because they are the main sector that often needs assistance right away. New owners have so much on their plate after purchasing a facility, they often become overwhelmed by state regulatory requirements. A little extra help from a UST professional at their site can make a huge difference when it comes to new owner compliance. Onsite compliance assistance also helps build critical relationships early on between the regulated community and the department.

Seth Hendrix

Last summer, Seth Hendrix provided onsite facility-specific training to UST facilities statewide. This training opportunity focused on new owners and operators of UST sites. Seth also extended the training to other operators that requested a site visit, but didn't fit into the focus group. Seth maximized his travel time by conducting required oversight inspections and compliance assistance visits on the same trip. He visited with facility owners and operators in Montana's big seven: Billings, Missoula, Great Falls, Butte, Bozeman, Helena, and Kalispell; and he assisted operators in smaller areas like Libby, Trout Creek, Colstrip, Miles City, Laurel, Sidney, and Fairview.



UST compliance summary checklist

During each compliance assistance meeting, Seth provided a UST compliance summary checklist with the appropriate regulatory items selected for owners and operators to use as a quick reference guide to see exactly what regulatory items need to be completed at their location. The checklist will help ensure that they know how to stay in compliance.

Facility operators have many options when it comes to choosing a primary tank and piping leak detection method. Some may meet their needs better than others. Seth reviewed best management practices at each facility and educated owners and operators on record-keeping requirements. The icing on the cake for Seth was meeting with Montanans from every walk of life and making connections with them face-to-face.

Compliance assistance is a win-win for the department and the regulatory community it serves, and the department will continue to offer onsite compliance assistance in the future. As it continues to educate its regulatory community, the department expects the investment to lead to a cleaner and friendlier environment. Let's hope it does. ■

Underground Storage Tank Program Administrative Rule Changes

The Underground Storage Tank (UST) program recently adopted the following changes into our administrative rules. These are:

- A change that allows the department to set "***another***" time frame for the correction of minor, or moderate violations, other than the currently defined time frame of "14 days before the expiration of the facility's Operating Permit." This rule change is significant such that after our review of your triennial compliance inspection, the program will have flexibility when establishing the time deadline for correction of minor or moderate violations. The knowledgeable UST owner/operator who has dealt with department issued violations in the past will likely be aware that this "flexibility" to issue corrective action dates other than those tied to the Operating Permit expiration date, has long been exercised by the department. This rule change will establish our authority in administrative rules where the program has presumed it to have previously existed. There is no change to the timeframe that "major" violations must be corrected by 14 days before the expiration date of the current Operation Permit.

- A change that incorporates Uniform Fire Code requirements into the administrative rule that requires an anti-siphon device be installed when an UST system produces a gravity head on underground piping. This situation occurs when either above ground storage tanks or mounded underground tanks are higher in elevation than the dispenser end of the piping run. Similar to the above change, the department has long asserted its authority in this regard with both compliance reviews and department issued construction permits by citing the fire code requirement. With this rule change, the department will have a requirement that is referenced directly to a program administrative rule.

Proposed Rule Change Ahead:
This year, the Underground Storage Tank (UST) will propose an administrative rule change that will eliminate the requirement that each tank have an EXPIRING Operating Tag on each UST fill pipe. In lieu of an every three year EXPIRING metal tag, the department will issue a one-time, NON-EXPIRING metal tag that will be valid for the life of the UST system and also be required to be attached to the UST fill pipe.

Be certain to remember that each tank must have a valid Operating Permit (paper certificate) issued by the department to receive and dispense petroleum product. Again, the part we are proposing to eliminate is the metal tag that the program issues every three years, replacing this expiring "green tag" with a non-expiring metal tank tag. We consider that each tank must still retain identification for record keeping and compliance activities. Therefore, each owner/operator on the first compliance inspection after the proposed rule is adopted will be required to place this non-expiring metal tag issued by the program with each Operating Permit, on to each UST fill pipe. Discard the existing operating tag to avoid future confusion.

The proposed rule also has language that incorporates federal requirements for delivery prohibition when there is ***significant non-compliance*** with any statute or rule adopted under the Montana Underground Storage Tank Act. Delivery prohibition is required by the Energy Act of 2005. The proposed rule will incorporate requirements for the UST section to notify the owner/operator and product deliverer notification of delivery prohibition. The program will then have 10 days to reverse delivery prohibition on the basis of a follow-up compliance inspection that resolves outstanding compliance violations such that the owner/operator may return the UST to service. ■

EPA Approves Use of E15. Now What?

The Environmental Protection Agency (EPA) granted a partial waiver of the Clean Air Act that allows the introduction of ethanol blends up to 15 percent (E15) in gasoline on October 13, 2010. This waiver allows the ethanol in gasoline to increase from E10 to E15. What does that mean for the underground storage tanks (UST) that store the higher blend of E15? Well, federal UST regulations state that "owners and operators must use an UST system made of or lined with materials that are compatible with the substance stored in the UST system" (40 CFR 280.32). So is E15 compatible with current UST equipment? That is not entirely known at the moment. EPA intends to issue guidance that will clarify UST compatibility requirements for ethanol blends greater than E10.

Historically, the compatibility of UST equipment has been determined by independent testing laboratories such as Underwriters Laboratories (UL). The estimated lifespan of an UST is about 30 years, meaning most UST systems currently in use are likely to contain components that were not designed to store ethanol blends higher than E10. These older systems are not likely to have UL certification or another independent testing laboratory certification for use with higher level ethanol blends. There is very little data available on the compatibility of UST equipment with ethanol blends, but preliminary testing shows that mid-level blends are the most degrading on UST components. Specifically, E25 has been shown to be the most degrading to UST components. There is a margin of error when addressing ethanol blends, which means with the margin of error, a blend of E15 could actually be closer to E20, which could be even more degrading to an UST system. Even increasing the blend of ethanol by as little as 5 percent means that demonstrating compatibility is extremely important.

Recently the EPA published a Notice of Proposed Guidance and request for comments on compatibility requirements for USTs storing ethanol blends greater than E10. EPA has acknowledged that it lacks data on the compatibility of higher ethanol blends with UST system equipment. The EPA is proposing guidance to clarify the compatibility requirements for greater than E10 blends and to provide greater flexibility for owners and operators who intend to store E15, including those whose equipment may not be certified as compatible by an independent testing laboratory. EPA considers the following three methods to be effective options to demonstrate compatibility: certification or listing by an independent testing laboratory, such as UL; equipment manufacturer approval; or another method determined by the implementing agency (Montana DEQ). In August 2010, American Petroleum Institute published an updated version of recommended practice (RP) 1626 that addresses the storing and handling of ethanol blends greater than E10. The second edition of RP 1626 can be used to show compatibility with E15.

EPA requested comments on six issues regarding the guidance for greater clarity in demonstrating compatibility of their tank systems. Although the comment period on these issues has closed, the following issues and questions were addressed by EPA:

1. *UST Components that May Be Affected by Biofuel Blends* – The following components may be affected by biofuel blends and must be checked for compatibility: tank or internal tank lining; piping; pipe adhesives and glue; line leak detectors; flex connectors; fill pipe; spill and overfill equipment; submersible turbine pump and components; fittings, gaskets, bushings, boots, and couplings; containment sumps; release detection floats, sensors, and probes.

   Questions: Are there components that should be added or removed from this list? Is it possible to demonstrate compatibility with these components?

2. *Methods to Demonstrate Compatibility* – For UST equipment that does not have a certification from a third-party laboratory, such as UL, the EPA is proposing the following three methods for compatibility: certification or listing by an independent testing laboratory; equipment manufacture approval; or another method determined by the implementing agency to sufficiently protect human health and the environment.

   Questions: Are the methods described above appropriate? Are these options feasible for UST owners? Are there other methods EPA should include?

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EPA Approves Use of E15. Now What? – *continued from page 9*

3. *Criteria for Equipment Manufacture Approval as a Compatibility Method* – The EPA wants to provide flexibility and therefore is considering relying on the manufacturer to issue a statement of compatibility for their UST equipment. These statements could be in the form of warranties, brochures, or letters. The criteria for these manufacture approvals should: be in writing; indicate affirmative statements of compatibility; and be from the manufacturer, not the installer or distributor.

   Questions: Are these criteria appropriate? Are the manufacturers willing and able to produce this approval? Are there other tools which might assist UST owners to obtain this information?

4. *Applicability to Biodiesel Blends* – EPA acknowledges that there is no UST equipment that has a UL listing for biodiesel blends. UL has stated that blends of B5 will not be required to have special investigation by UL, meaning that these fuels are to be considered the same as conventional diesel. Fuels with greater than B5 blends may have a significant effect on UST materials. EPA is seeking input on what percentage of biodiesel should be considered for the guidance document.

   Questions: Should EPA include biodiesel in the guidance? What biodiesel blend percentage should EPA use in the guidance?

5. *Ability to Demonstrate Compatibility Using the Proposed Guidance* – The long expected lifetimes of UST systems, along with the high turnover rate of owners and operators, make it difficult to locate documentation for all equipment installed. Without knowing exactly what equipment is installed, demonstrating compatibility will be difficult for those wishing to store E15. Even if all equipment is known, there is the possibility that the current equipment will not be compatible with E15.

   Questions: Based on the issues described in 1 and 2 above: How difficult will it be for owners and operators to demonstrate compatibility for these components? How many UST facilities will not be able to demonstrate compatibility based on these criteria? What would be necessary for these facilities to come into compliance (for example, replace seals, replace release detection probes, or replace entire UST system)?

6. *Other Options that Sufficiently Protect Human Health and the Environment* – The EPA recognizes that some owners and operators of UST systems may not be able to demonstrate compatibility with the criteria listed above.

   Questions: Without documentation, are there alternative methods UST owners and operators can rely on or activities they could perform that would sufficiently protect human health and the environment?

These issues and questions will hopefully be answered in the guidance document that EPA is working on to address the compatibility requirements for UST systems storing higher than E10 blended fuels. The issuance of the waiver of the Clean Air Act does not override the UST owner or operator requirement to comply with all applicable UST regulations, including the compatibility requirement. In the meantime, if you wish to convert your UST system to E15, please contact the Montana Department of Environmental Quality Underground Storage Tank Section at (406) 444-5300. ■

jUST Jargon – Recovery Well

In environmental remediation, a recovery well is an extraction well to recover petroleum from the ground. For instance, a recovery well or wells can be used following accidental release of gasoline from an underground storage tank. Generally, the diameter of recovery wells is larger than that of monitoring wells in order to accommodate recovery equipment placed down the well and to allow product to flow freely into the well.

Driving Biofuels

Ethanol and other renewable energy biofuels are drawing attention, from researchers in Montana to policymakers in Washington, D.C. Biofuels are produced from living organisms or recently living things like wood, waste or food products. Montana State University recently received a grant to test the production of biodiesel from fungi. Concerns about greenhouse gas emissions from fossil fuels, oil prices and energy security are driving the popularity of biofuels.

Ethanol is made by fermenting components of plant materials. It's used mostly in the U.S. and Brazil as a gasoline additive to increase octane and improve vehicle emissions. President Obama recently signed a one-year extension of the 45 cents per gallon Ethanol Excise Tax Credit, the 10 cents per gallon Small Ethanol Producer Tax Credit and the 54 cents per gall on protective tariff on imported ethanol. Most cars in the U.S. can run on ethanol/gasoline blends of 10 percent ethanol.

Biodiesel is made from vegetable oils, animal fats or recycled greases and is usually used as a diesel additive to reduce levels of particulates, carbon monoxide and hydrocarbons from diesel-powered vehicles. In Europe, biodiesel is the most common biofuel.

Montana Connection

Biofuels production is an important component of Governor Brian Schweitzer's energy policy. It can create new markets for agricultural products, reduce our state and our nation's dependence on imported oil, attract investment and create jobs in economically-distressed rural Montana.

Biofuels can be environmentally sound substitutes for petroleum-based transportation fuels and related products. Missoula reduced wintertime carbon monoxide emissions 23 percent by using an oxygenated fuel. It uses an 8 percent ethanol blend with gasoline. Montana uses about 17.5 million gallons of ethanol blend annually to reduce or prevent carbon monoxide pollution from transportation and to help provide a market for ethanol production in Montana. In 2001, an ethanol (E-85) pump was installed at Economart in West Yellowstone, Montana. The Montan DEQ worked with Yellowstone National Park to require that National Park Service managers make E-10 available year-round in all of the park's public service stations.

Ethanol raises concerns about increased food prices due to the large amount of arable land required for crops, which is where Montana comes in. Montana boasts of a total land area of 145,000 square miles, the nation's 4th largest state. Montana has 16.5 million acres of crop land suitable for growing grain and/or oil seed crops for use in ethanol and biodiesel production.

It also has 19 million acres of non-reserved forest land available for production of cellulosic ethanol and other biofuels.

Limited biodiesel production is ongoing in Florence, Great Falls, Helena, Livingston, and Simms. Montana Microbial Products, LLC, is a leader in enzymes for cellulose and barley-based reduced energy ethanol production. The company operates a pilot plant in Butte to demonstrate this process with select cellulosic feedstocks. DEQ conducts biodiesel production workshops for those interested in starting a business.

For more information visit the Montana DEQ biofuels web page: **http://deq.mt.gov/Energy/bioenergy/default.mcpx**.

Additional information about ethanol is maintained by the Ethanol Producers and Consumers of Montana (EPAC), at **www.ethanolmt.org**. ■

EPA Proposes Guidance for Underground Storage Tanks

As part of its commitment to helping ensure that biofuels, such as ethanol and biodiesel, are safely stored in underground storage tanks, the U.S. Environmental Protection Agency released draft guidance for UST owners and operators who wish to store these fuels. EPA requested comments on the proposed guidance which clarifies how an UST owner or operator can comply with the federal compatibility requirement for UST systems storing gasoline containing greater than 10 percent ethanol, and diesel containing a percent of biodiesel yet to be determined. After reviewing comments, EPA intends to issue the final guidance in early 2011.

For more information on the guidance visit **http://www.epa.gov/oust** or contact Andrea Barbery (barbery.andrea@epa.gov) of EPA's Office of Underground Storage Tanks. ■

2010 National Tanks Conference and Expo – On Funding

The National Tanks Conference and Expo was held September 20-22, 2010, in Boston. On the agenda were four sessions on financial issues of interest to petro fund administrators: State Fund Administrators Open Forum; Private Insurance and Financial Responsibility; Actuarial Perspective of Enough Money to Complete Cleanups; and, a Cost Control Roundtable.

The open forum allowed state fund administrators to discuss key issues affecting state funds. The private insurance session focused on the use of private insurance as a mechanism to meet underground storage tank financial responsibility requirements. The speakers discussed common issues related to insurance policies such as policy limits, exclusions and reporting requirements. During the actuarial session, assumptions and conditions that affect the calculation of the average site cleanup costs were discussed. The cost control roundtable examined various processes used by state cleanup funds to control eligible cleanup expenditures. ■

Petro Factoid. . . Leak Line

Suspected or confirmed petroleum releases must be reported to the DEQ within 24 hours of being detected, as required by the Administrative Rules of Montana.

Just call the Leak Line at 1-800-457-0568, or after hours at (406) 324-4777. Please note that the number for after hours is a new number, replacing (406) 841-3911.

When you call you must talk to a person. Voicemails are not adequate notification.

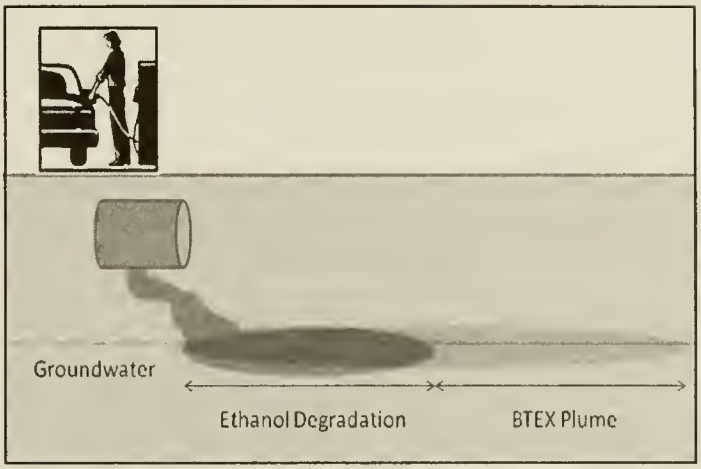
Plumes Behaving Badly – The Impact of Ethanol-blended Fuels on Contaminant Plumes

Recently, Federal Energy Act requirements mandated the use of 10 percent ethanol in motor vehicle fuels. Current mandates will probably increase ethanol content to 15 percent. When released to the environment from a leaking tank or surface spill, ethanol-blended fuels present greater challenges to remediation than conventional gasoline due to the chemistry of the fuel and consequent plume behavior. From a remediation standpoint, ethanol-blended fuel releases create contaminant plumes that, for lack of a better term, "behave badly."

Why do these plumes behave badly, or worse, than plumes from conventional gasoline releases? Ethanol has a strong aerobic capability, meaning that it supports microorganisms that use oxygen to survive. Successful remediation at typical petroleum release sites depends, in part, on the ability of microorganisms to "consume" or metabolize chemicals such as benzene. Microbes scavenge and breathe oxygen as they consume hydrocarbons. So oxygen becomes depleted as contaminant plumes migrate. Microbial populations tend to shift to facultative or anaerobic organisms that take over degradation processes as oxygen becomes more depleted. Once ethanol is depleted, microbes continue to use other chemicals as a food source, but degrade these compounds more slowly in the absence of oxygen.

At petroleum release sites where ethanol is not added to fuels, the microbiological community will break down hydrocarbon contaminants more quickly and reduce contaminant concentrations, a process referred to as "natural attenuation." However, when ethanol is available, microorganisms will consume the ethanol before consuming the other constituents. As the plume moves away from the source area and the ethanol is consumed, other constituents continue to migrate (see figure). This means that ethanol-blended fuel releases can travel farther than conventional gasoline releases.

Ethanol will also increase the solubility of the contaminants of concern that DEQ regulates during remediation of petroleum releases. Ethanol is infinitely soluble or "miscible" in water. As a result, other chemicals present in the fuel blend become more soluble in water in the presence of ethanol, a property called co-solubility. So, if ethanol dissolves in water, other chemicals dissolved in it have a greater ability to become dissolved in water. In some cases, pure ethanol releases have remobilized existing gasoline plumes due to co-solubility effects.



As the plume moves away from the source area and the ethanol is consumed, other constituents continue to migrate.

In summary, ethanol-blended fuel releases have contaminant plumes that are longer and travel faster than releases from conventional fuels. This is due to ethanol's high solubility with water. Also, microorganisms will consume ethanol preferentially over other organic compounds such as benzene.

These two qualities explain why ethanol-blended gasoline releases "behave badly," require greater remediation effort to address, and can be more costly than releases from conventional gasoline. ■

Conversations at the 2010 National Tanks Conference and Expo

During the 2010 National Tanks Conference held this past fall in Boston, two recurring themes emerged during technical talks about remediation: source mass reduction and green remediation.

Source Mass Reduction – Several sessions and presentations mentioned source mass reduction as an issue in remediation. Source mass can be thought of as the area that is contaminated with free product (soil saturated with petroleum). Free product presents an issue for remediation because it continues to contaminate groundwater to levels that keep a release from closure. Advice or guidance presented by the speakers included:

- Setting remedial goals at all stages of remediation (investigation through technology selection);
- Understanding petroleum free product behavior and processes in the ground that control the extent of contamination. For instance, it does not "float on top" of the water table, rather it finds its way into pore spaces even below the water table;
- Finding source areas using innovative approaches to reduce repeat personnel visits or equipment mobilization, such as Laser Induced Fluorescence, which is a field tool for finding petroleum and geophysical parameters;
- Optimizing remediation (operating cost vs. mass recovered, remote monitoring, targeting low mass recovery wells, training personnel on what to look for and what not to do, using data trends and computer enhanced visual projections of source areas);
- Revisiting old sites and feasibility studies to find additional remediation methods.

The overall take-home message was that site characterization (or definition), source investigation, and regulatory goals are key to remediating sites, reducing the time to meeting remediation goals, and making effective remediation decisions.

Green Remediation – A session was specifically devoted to presenting ideas and tools for "green" remediation that could cut environmental impacts and carbon dioxide emissions, and save money. Speakers highlighted strategies, actual technologies, pilot studies, and implemented ideas. Specific examples of strategies being used in two states were:

- California
  - Generating power back to the grid;
  - Decreasing impacts to the environment (this is not the same as "sustainable");
  - Beginning projects with a well-defined site characterization (optimization assessment often impacts efficiency);
  - Sequencing project stages (good project managers and on-the-ground consultants know how to keep equipment running and "useful," which saves energy);
  - Using high-density information (e.g., LIF or similar remedial investigation techniques);
  - Employing low flow techniques for well purging over pumping purge volumes;
  - Treating and reusing contaminated soils on-site (time and space are critical components to this strategy).

- South Dakota
  - Pilot project using bio-electric chemical remediation (or using nature to power a battery);
  - Old site with free product (both diesel and gasoline);
  - Bacteria eat hydrocarbons and fuel the battery; the theory being to create a sustained voltage to power the remediation system;
  - Measurable decrease in contamination was detected, although still in the pilot project phase. ■

It's Natural...Attenuation

In September 2009, the DEQ Petroleum Technical Section (PTS) received additional grant funding from EPA to address lower priority petroleum releases. This grant specifically addressed release sites where all practical physical clean-up has been completed (e.g., over-excavation of accessible impacted soil or an in-situ treatment such as Soil Vapor Extraction) but residual petroleum contamination is significant enough to keep the groundwater from reaching water quality standards.

PTS manages about 190 petroleum releases that are in the low priority category that typically only need periodic groundwater monitoring, approximately once every one to three years. However, this EPA grant money allowed PTS staff to focus and apply their expertise into more comprehensively reviewing these releases. In doing so, we found that not all Priority 4 releases were at the same level of remediation. Some releases were found to need more investigation to define the extent of contamination, while other releases were found to be ready for closure. These releases were subsequently reprioritized so that they may be adequately addressed in future PTS actions.

The remaining releases that were not reprioritized were analyzed for attenuation. From a remediation standpoint, a decrease in contaminant concentration over time indicates that a release is cleaning up through natural processes. These processes are physical and biological in nature. Examples of physical attenuation are adsorption to soil particles, dispersion and mixing with groundwater, and degassing. Biological attenuation is achieved when naturally occurring microorganisms consume, or "eat," petroleum chemicals. The EPA (and other remediation entities) refers to this process as monitored natural attenuation because several geochemical parameters can be collected to monitor a shrinking plume as a result of biological activity. In order to consume petroleum contamination, microorganisms require sufficient natural electron acceptors. These electron acceptors are what the microorganisms need to breathe, and they can be analyzed to determine whether they naturally occur in sufficient quantities. If they do, then microbiology may be considered an appropriate remediation technology.

To determine whether attenuation was occurring, PTS analyzed the water quality data at individual release sites where enough data was available utilizing an Excel spreadsheet to determine if any trends existed in the data. A program was developed in the Excel spreadsheet to do simple statistical analysis. Utilizing these trends, the program estimated the number of years that a release-specific trend would require to achieve water quality standards. PTS found that a number of releases have favorable trends where water quality is improving and may meet standards within five to ten years.

However, some release data indicate that more than twenty years will be required to reach cleanup goals (water quality standards). Despite practical remediation being completed, these releases are not likely to achieve remediation through biological processes. These sites typically have finer grained soil, such as tight clays, and the contamination is too deep or not amenable for excavation. Typically, finer grained soils also limit groundwater flow and naturally retain petroleum chemicals. While microorganisms are likely present and consuming the petroleum contamination, they do not have enough electron acceptors to effectively reduce the plume size. Therefore, there will be releases in Groundwater Management that will require many, many years to naturally attenuate. As a result they are likely to remain open for many years.

At the time of the writing of this article, PTS is still calculating the numbers for the releases that fit into the discussed situations. A follow-up article is anticipated to further discuss the analysis of the Priority 4 releases.

For further information, please contact Rebecca Ridenour at (406) 841-5059 or rridenour@mt.gov. ■

Petroleum Mixing Zone Legislation

Senate Bill 9, introduced by Senator Jim Keane, would authorize the establishment of a petroleum mixing zone when no further corrective action is reasonably required at a site. Under this bill, petroleum mixing zones can be established for defined petroleum plumes in groundwater where natural breakdown or attenuation of petroleum is occurring as a part of the remediation and resolution of petroleum releases. A "petroleum mixing zone" would be an area where water quality standards may be exceeded subject to certain conditions and consistent with rules adopted under 75-11-318, 75-11-319, and 75-11-505, MCA. Conditions would include requiring that removal of reasonably accessible source material be completed. The petroleum mixing zone must be contained within the boundary of the property on which the petroleum release originated unless a recorded easement on an adjoining property allows the petroleum mixing zone to extend onto the adjoining property. Once a petroleum mixing zone is approved, the department would then issue a No Further Action letter to the owner/operator. In addition, the bill provides that the board may reimburse the cost of an easement. The bill language may be obtained by entering the bill number, SB 9, into the Montana Legislature's Bill Information Look Up web page, **http://laws.leg.mt.gov/laws11/law0203wS.startup.** ■

Petro Board Forms

With the new year, the Petroleum Tank Release Compensation Board has replaced its Microsoft Word format forms with more user-friendly Adobe PDF versions. These new Adobe PDF-format forms are available on the board's webpage at **http://deq.mt.gov/pet/forms.mcpx**. You will need Adobe 7.0 or higher to use online input forms properly. The forms can be filled out online, then printed, signed, notarized, and sent to the Petroleum Tank Release Compensation Board. You may also save them to your computer using Adobe 7.0 or higher. These new versions should be easier to use, but please let us know about any problems you may have with them. Free downloads of Adobe software are available at Adobe.com.

For those of you receiving claim forms from us in Word format (the ones with the work plan information on them), please continue to submit them using that format.

If you have any questions, please feel free to contact Janet Adolph at (406) 841-5090 or jaadolph@mt.gov. ■

Petro Factoid. . . DEQ Project Officers Earn PE Licenses

Two project officers with the Montana Department of Environmental Quality recently earned their Professional Engineering licenses from the Montana Board of Engineering and Surveyors. Marla Stremcha and Scott Eklund work for the DEQ Petroleum Technical Section. Marla is headquartered in DEQ's Billings office and handles storage tank releases in Southeast Montana. Scott is based out of Kalispell and remediates releases in Northwest Montana. Congratulations to both of them.

Chemical Health Effects of Tetraethyllead

Tetraethyllead (common name tetraethyl lead), abbreviated TEL, is a lead compound used as an antiknock additive/octane booster in gasoline. Although TEL usage was largely discontinued because of the toxicity of lead and its adverse effect on catalytic converters, it is still used as an additive in aviation fuel.

According to Wikipedia, "TEL was first discovered by a German chemist in 1854, but remained commercially unused for many years. In the 1920s, General Motors Corporation found TEL to be an effective antiknock agent." They patented the use of TEL as a knocking agent and called it "Ethyl" in its marketing materials to avoid the negative connotation of the word "lead." The Ethyl Corporation was created by Standard Oil of New Jersey (ESSO/EXXON) in 1924. General Motors then created the Ethyl Gasoline Corporation to produce and market TEL. TEL was blended together with the lead scavengers 1,2-dibromoethane and 1,2-dichloroethane for mixing with raw gasoline.

Documented health effects in the general population and acute health effects in children exposed to TEL, led to the phase-out of TEL in motor fuels in the United States during the mid-1980s.

In most states TEL was replaced with the fuel oxygenate, Methyl-Tertiary Butyl Ether (MTBE). The U.S. Centers for Disease Control documented that after the phase-out of TEL, blood lead levels in U.S. children dramatically decreased. High concentrations of TEL still exist in the soil adjacent to roads constructed prior to the phase-out of TEL. Children are particularly at risk if they consume soil contaminated with TEL. ■

New After-Hours Phone Number for Petroleum Releases: (406) 324-4777

The state of Montana Disaster and Emergency Services (DES) agency has a new emergency telephone number. The new number is (406) 324-4777, replacing (406) 841-3911.

The Montana Department of Environmental Quality (DEQ) has been working on amending rules that reference the number.

Please use the new number (406) 324-4777 after hours when reporting suspected or confirmed petroleum releases, which must be reported to the DEQ within 24 hours of being detected as required by administrative rules.

The DES is responsible for helping Montana communities prepare for disasters and emergencies, and when requested, assisting with response and recovery efforts. The new number will continue to be available 24 hours a day, reaching the main office during normal working hours and the staff duty officer after hours and on holidays.

You are encouraged to make changes in your contact information. During business hours, you should call the DEQ Leak Line at 1-800-457-0568. ■

jUsT Jargon – Appropriate Enforcement

Appropriate enforcement means that any enforcement action taken by the Montana Department of Environmental Quality should be effective in causing a prompt return to compliance and in deterring future noncompliance.

Board Rules

The Petroleum Tank Release Compensation Board recently held a public hearing to consider proposed amendment, adoption or repeal of board administrative rules (MAR notice No. 17-313). The hearing was held on February 2, 2011, at the Last Chance Gulch building of the Montana Department of Environmental Quality.

Rule amendments are a product of the work group established by the board to examine the rules given the statutory changes made to the board's law in 2009 (SB0097). Numerous definitions have been added and amended because the board is called on from time-to-time to interpret those terms while administering the board's program.

The applicable rules governing the operation and management of petroleum storage tanks were amended when the state adopted the 2009 International Fire Code. Several policies and practices of the board have been proposed to be implemented into board rules.

Please watch for continued updates on the board's website at **http://deq.mt.gov/pet/default.mcpx.** ■

SAVE THE DATE

Petroleum Tank Release Compensation Board – 2011 Meeting Schedule

April 11 • June 27 • September 12 • November 21
10:00 a.m. – 2:00 p.m.
Montana Department of Environmental Quality
Room 111 • Lee Metcalf Building
1520 East Sixth Avenue • Helena, MT 59620
Contact: Terry Wadsworth • 841-5092
twadsworth@mt.gov

Consultants Meeting

May 9, 2011 • 1:30 p.m. – 3:30 p.m.
Montana Department of Environmental Quality
Room 122 • Last Chance Gulch Building
1100 North Last Chance Gulch • Helena, MT 59620
RSVP by April 27, 2011
either by phone: (406) 841-5000 or
Email: Janet Sanderson jsanderson2@mt.gov
Please direct questions to:
Mike Trombetta • 841-5045 mtrombetta@mt.gov
**The meeting will also be webconferenced.*

UST Compliance Inspector and UST Installer/Remover Refresher Course

February 25, 2011
8:00 a.m. – 5:00 p.m.
Montana Department of Environmental Quality
Room 111 • Lee Metcalf Building
1520 East Sixth Avenue • Helena, MT 59620
Contact: Teresa Sturm • 444-3840 • tsturm@mt.gov
Underground Storage Tank Section

Montana Petroleum Marketers and Convenience Store Association 2011 Annual Convention/Trade Show

June 7– 9, 2011
Hilton Garden Inn
3720 North Reserve Street • Missoula, MT
Contact: Ronna Alexander • 449-4133 ccomm@bresnan.net
or visit: http://www.wpma.com/montana/convention

Fund and Release Status Report

Petroleum Fund Financial Status — Through end of 2nd Quarter, Fiscal Year 2011
(July 1, 2010 – December 31, 2010)

Total Revenue:	$3,266,244
Current and Prior year Claims Expenditures:	$2,152,354
Total Expenditures:	$2,669,245
Outstanding Work Waiting to be Obligated:	$2,152,242

Petroleum Releases – Through end of 2nd Quarter, FY 2011
(July 1, 2010 – December 31, 2010)

New Releases:	17
Releases Resolved (Closed):	42

Petroleum Release Activity Status – Since Fall 2010 *MUST News*
(November 15, 2010 – December 31, 2010)

New Releases:	2
Releases Resolved (Closed):	18

Summary of Total Petroleum Release Activity

Total Confirmed Releases:	4,497
Total Active Releases:	1,534
Total Releases Resolved (Closed):	2,963

(Please note these "closed" numbers include sites that have been transferred to another program or agency.)

Acknowledgements to those involved in the production of the winter 2011 *MUST News:*

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MUST News

Winter 2011

MUST News is a quarterly communication tool produced by the Montana Department of Environmental Quality to inform and update petroleum storage tank owners and operators, environmental consultants and others interested in developments about underground storage tank operation, rules, release prevention, remediation and reimbursement.